REMARKS/ARGUMENTS

The present amendment and accompanying Request for Continued Examination (RCE) are in response to the Office Action dated April 18, 2005. Claims 55-80, 83 and 84 are active in the present application. Claims 81 and 82 have been canceled. Claims 55, 58, 60,-62, 64-71 and 74 have been currently amended, and new Claims 83 and 84 has been added. Claims 58, 60, 62, 66-71 and 74 were amended to correct typographical and grammatical errors. Support for the amended claims can be found throughout the specification, and in the original claims. Particular support for amended Claim 55 can be found in paragraphs [18] to [22], [34] and [38] to [59] of the specification. Particular support for amended Claims 61 and 64 can be found in paragraph [37] of the specification. Particular support for amended Claim 65 can be found in original Claim 16. Particular support for new Claim 83 can be found paragraphs [27], [63] to [68], [95] to [100], [126] to [130], Tables 4a-4c and Table 5 of the specification, and in original Claim 36. Particular support for new Claim 84 can be found in paragraphs [139], [143], [145] and [146], Table 7 (page 36, Inventive Examples 1-3), Table 13 (Inventive Examples 7 and 8), Table 18 (page 57) and Table 19 (page 58, Inventive Examples 9 and 11). No new matter is believed to have been introduced by the amendments to the claims.

Applicants also submit, herewith, an Information Disclosure Statement (IDS). Applicants note that a majority of these references were listed on a prior IDS filed on April 2, 2004; however, these particular references were apparently missing with the IDS. Applicants request that the Examiner acknowledge the references cited in the IDS, by returning to Applicants' undersigned representative, a signed, initialed and dated copy of the corresponding PTO/SB/08 form.

Claim Rejection under 35 U.S.C. § 112

The Examiner rejected Claims 55-80 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. Applicants respectfully traverse for the following reasons.

Applicants have amended Claim 55, as shown above, to remove the phrase "same catalyst system is used to make the LMW component and the HMW component," thus, rendering the rejection of Claims 55-80 moot. However,

Applicants have added new Claim 83, which recites this feature. Applicants submit that Claim 83 is particularly supported by the written description in paragraphs [95] to [100], [126] to [130], Tables 4a-4c and Table 5 of the present specification (see also paragraphs [63] to [68] and original Claim 36).

For example, in Example 1 (see paragraphs [95] and [96]), the catalyst system used in a polymerization system, comprised of two reactors, configured sequentially, was an immobilized supported borate constrained geometry catalyst system. This catalyst system was used to prepare the particular polymer in each reactor, with high density polyethylene prepared in the first slurry, stirred-tank reactor (see paragraph [98]).

Therefore, for at least the above reasons, new Claim 83 is supported by the written description of the present invention.

Claim Rejections under 35 U.S.C § 102

The Examiner rejected Claims 55-65, 72-75 and 78-80, under 35 U.S.C. §102(b), as anticipated by U.S. Patent 4,461,873 to Bailey et al. (hereinafter Bailey). Applicants respectfully traverse for the following reasons.

Pending Claims 55-65, 72-75 and 78-80 are directed, in part, to a polyethylene composition comprising a low-molecular-weight (LMW) ethylene homopolymer and a high-molecular-weight (HMW) ethylene interpolymer, and wherein the HMW component has a molecular weight distribution less than about 5 and a substantially uniform comonomer distribution, or has a reverse comonomer distribution. Bailey does not teach or suggest a HMW component having a molecular weight distribution less than about 5 and a substantially uniform comonomer distribution, and does not teach or suggest a HMW component having a reverse comonomer distribution. Moreover, Bailey does not teach or suggest these features in combination with other features recited in these claims.

Bailey is directed to ethylene polymer blends of a high molecular weight ethylene polymer and a low molecular weight ethylene polymer (see abstract, Table 1 and Table 2 (columns 2-3)). Bailey discloses that the preferred ethylene polymers and copolymers are produced with high productivity catalysts, such as titanium/magnesium catalysts, used in conjunction with organoaluminum cocatalysts

(see column 3, lines 54-58; column 5, lines 27-32 and column 16, lines 12-15). Bailey also discloses commercial ethylene polymer resins produced with chromium oxide catalysts (see column 7, lines 39-43; column 25, lines 65-68). Bailey does not specifically teach a high molecular weight ethylene interpolymer component, having a molecular weight distribution less than about 5 and a substantially uniform comonomer distribution, and does not specifically teach a high molecular weight ethylene interpolymer having a reverse comonomer distribution; and there is no suggestion that the catalysts systems disclosed in Bailey would produce such high molecular weight polymers as recited in pending Claim 55. Based on the general nature of the catalyst systems disclosed, one of ordinary skilled in the art would appreciate that the titanium/magnesium catalysts and chromium oxide catalysts, both used in the preparation of the ethylene polymers of Bailey, should not produce such high molecular polymers as recited in pending Claim 55. Therefore, for at least the above reasons, Bailey does not teach or suggest pending Claims 55-67, 72-75 and 78-80.

In addition, Bailey does not teach or suggest a polyethylene composition comprising a low-molecular-weight (LMW) ethylene homopolymer component, and a high-molecular-weight (HMW) ethylene interpolymer component, and wherein the composition has a molecular weight distribution less than 17.5; and does not teach or suggest these features in combination with the other features, as recited in new Claim 83. Bailey teaches a blend molecular weight distribution greater than 18, and preferably from 20-35 (see Tables 1 and 2 (columns 2 and 3)). These values are outside the scope of new Claim 83. Moreover, Applicants have shown, increases in certain mechanical properties, for example, Young's modulus, 3-Point Flexural Young's modulus and Izod Impact, in compositions containing a high molecular weight component and a low molecular weight component, each prepared from the same catalyst system (see Table 19, page 58; and paragraphs [136]-[145]). Such increased properties are indicative of the novelty of the composition, as claimed in new Claim 83. Therefore, for at least these reasons, Bailey does not teach or suggest new Claim 83.

Moreover, Bailey does not teach or suggest a polyethylene composition containing a low-molecular-weight (LMW) ethylene homopolymer that is prepared

from a constrained geometry catalyst, and does not teach or suggest this feature in combination with the other features recited in new Claim 84. Applicants have shown higher "Rapid Crack Propagation, Gc" values and lower ductile-brittle transition temperatures, T_{db}, for polyethylene compositions containing a low molecular weight component prepared from a constrained geometry catalysts. Such compositions have improved Gc and T_{db} values, as compared to similar compositions, containing the same high molecular weight component, and a low molecular weight component prepared from a Ziegler-Natta (NDA) catalyst system (see Table 18, page 57; Table 19, page 58, Examples 8 and 9 and Examples 10 and 11; and paragraphs [136] to [147]). These improved properties are evident of the novelty of the composition, as claimed in new Claim 84.

Therefore, for at least the above reasons, Bailey does not teach or suggest the invention as now claimed, and the rejection should be withdrawn.

The Examiner rejected Claims 55, 57-61, 63, 72, 73, 79 and 80 under 35 U.S.C. § 102(b), as anticipated by U.S. Patent 5,319,029 to Martin et al. (hereafter Martin). Applicants respectfully traverse for the following reasons.

Martin does not teach or suggest a polyethylene composition comprising a low-molecular-weight (LMW) component and a high-molecular-weight component (HMW), and wherein the HMW component has a molecular weight distribution less than about 5 and a substantially uniform comonomer distribution, and does not teach or suggest a HMW component that has a reverse comonomer distribution. Moreover, Martin does not teach or suggest these features in combination with the other features as recited in pending Claims 55, 57-61, 63, 72, 73, 79 and 80.

Martin is directed to a composition, comprising a low molecular weight ethylene resin, made using a titanium (titanium chloride) catalyst system, and a high molecular weight ethylene copolymer resin, made using a chromium catalyst system (see, for example, abstract; column 1, line 42 to column 2, line 10; column 2, lines 13-19, column 3, lines 21-28; column 4, lines 10-18, and Tables E1 and E2 (columns 6 and 7)). Martin discloses comparative resins, made from chromium catalyst systems or a titanium catalyst system (see column 7, lines 34-39). Martin also discloses a comparative low molecular weight polyethylene resin prepared from a chromium

oxide based catalyst (see Table E1, resin L2), and two high molecular weight polyethylene resins prepared from a titanium chloride-based catalyst (see Table E2, resins H4 and H6). The chromium catalyst systems, disclosed in Martin, include a chromium oxide-based catalyst system. Martin does not specifically describe the particular catalysts systems used in the preparation of the polyethylene resins, as described in the examples. Also, Martin does not specifically teach a high molecular weight ethylene copolymer, having a molecular weight distribution less than about 5 and having a substantially uniform comonomer distribution, and does not specifically teach a high molecular weight ethylene copolymer having a reverse comonomer distribution; and does not suggest such polymers. One of ordinary skilled in the art would appreciate that, based on the nature of the generally described catalyst systems used to prepare the high molecular weight component of the examples of Martin, such systems would not produce the high molecular weight ethylene interpolymers, as recited in pending Claim 55. Moreover, the molecular weight distributions (8.0, 21.4 and 22.9) listed in Table E2 of Martin are greater than 5, and are thus outside of Applicants' recited range for the high molecular weight component with the substantially uniform comonomer distribution. Thus, Martin does not teach or suggest pending Claims 55, 57-61, 63, 72, 73, 79 and 80.

In addition, Martin teaches that its high molecular weight component and its low molecular weight component are made using two different catalyst systems. Martin does not teach or suggest the combination of features recited in new Claim 83. Martin teaches away from the use of the same catalyst system for the preparation of both components, by teaching the importance of having the low molecular weight component made by a titanium chloride based catalyst system, and the importance of having the high molecular weight component made by a chromium oxide based catalyst system. Such a combination results in improved Environmental Stress Crack Resistance (ESCR) (see column 7, lines 49-62; column 3, lines 23-25 and column 4, lines 12-14). Therefore, for at least these reasons, Martin does not teach or suggest new Claim 83.

Also, Martin does not teach or suggest a polyethylene composition containing a low-molecular-weight (LMW) ethylene homopolymer that is prepared from a constrained geometry catalyst, and does not teach or suggest this feature in

combination with the other features recited in new Claim 84. As discussed above, Applicants have shown improved properties in compositions that contain such a low molecular weight component, and these improved properties are indicative of the novelty of the composition, as claimed in Claim 84.

Therefore, for at least the above reasons, Martin does not teach or suggest the invention as now claimed, and the rejection should be withdrawn.

The Examiner rejected Claims 55, 57, 59-64, 72-75, and 78-80 under 35 U.S.C. § 102(b), as anticipated by U.S. Patent 6,462,135 to Rohde et al. (hereinafter Rohde). Applicants respectfully traverse for the following reasons.

Rohde is directed to a low-odor polyethylene blend, made from a high-molecular weight ethylene copolymer, obtainable by polymerization in the presence of a Ziegler catalyst, and from a low-molecular-weight ethylene homopolymer or ethylene copolymer, obtainable by polymerization in the presence of a chromocene catalyst on an oxidic support (see, for example, abstract; column 3, line 10 to column 4, line 23; column 6, lines 25-33; column 6, lines 38-44; and Tables 1-3). Rohde does not specifically teach a high molecular weight ethylene copolymer having a molecular weight distribution less than about 5 and a substantially uniform comonomer distribution, and does not specifically teach a high molecular weight ethylene copolymer having a reverse comonomer distribution; and does not suggest such copolymers. One of ordinary skill in the art would not recognize the Ziegler catalyst system, disclosed in Rohde, and used for the preparation of the high molecular weight polyethylene component, as producing the ethylene interpolymers as recited in pending Claim 55. Also, this Ziegler catalyst system produces an ethylene copolymer with a molecular weight distribution of 6.8 (see Table 1), and is thus outside of Applicants' recited range for the high molecular weight component with the substantially uniform comonomer distribution. Therefore, for at least these reasons, Rohde does not teach or suggest pending claims 55, 57, 59-64, 72-75 and 78-80.

In addition, Rohde does not teach or suggest the polyethylene composition as recited in new Claim 83. Rohde discloses a polyethylene blend, C7 (see Table 3), prepared from a low-molecular weight component, C3, which is prepared using the same Ziegler catalyst (Sylopol 5950, Grace), as that used for the high molecular

weight component. However, this "C3" component has a molecular weight distribution of 10.8 (see Table 1), which falls outside the scope of new Claim 83. Moreover, Rohde teaches away from blends prepared from Ziegler-catalyzed, low-molecular-weight components, by teaching that such blends have increased odor and higher total conductivity, as compared to the inventive blends of this reference (see Table 3 and column 9, lines 17-31). Therefore, for at least these reasons, Rohde does not teach or suggest new Claim 83.

Also, Rohde does not teach or suggest a polyethylene composition containing a low-molecular-weight (LMW) ethylene homopolymer that is prepared from a constrained geometry catalyst, and does not teach or suggest this feature in combination with the other features recited in new Claim 84. As discussed above, Applicants have shown improved properties in compositions that contain such a low molecular weight component, and these improved properties are indicative of the novelty of the composition, as claimed in Claim 84.

Therefore, for at least the above reasons, Rohde does not teach or suggest the invention as now claimed, and the rejection should be withdrawn.

The Examiner rejected Claims 55-57, 59-64, 66, 69, 72-74 and 77-80 under 35 U.S.C. § 102(b), as anticipated by U.S. Patent 6,545,093 to de Lange et al. (hereinafter de Lange). Applicants respectfully traverse for the following reasons.

Reference, de Lange, is directed to bimodal polyethylene blends made from a high-molecular-weight ethylene copolymer and a low-molecular-weight ethylene homopolymer or copolymer (see abstract). This reference discloses that the low molecular weight component is preferably prepared in the presence of a chromocene catalyst on an oxidic support, and the high-molecular-weight component is preferably prepared in the presence of a Ziegler catalyst (see, for example, column 3, lines 43-45; column 4, lines 5-7; and column 6, lines 9-11). This reference does not describe the particular catalysts used in the preparation of the polymer components. Moreover, this reference does not specifically teach a high molecular weight ethylene copolymer having a molecular weight distribution less than about 5 and a substantially uniform comonomer distribution, and does not specifically teach a high molecular weight ethylene copolymer having a reverse comonomer distribution; and does not suggest

these polymers. Based on the general nature of Ziegler catalysts, one of ordinary skilled in the art would appreciate that the generally described Ziegler catalyst used to prepare the high molecular weight component of de Lange, would not produce the high molecular weight interpolymers of pending Claim 55. Also, the molecular weight distribution for the high molecular polyethylene component produced by this catalyst is 6.8 (see column 5, lines 20-25), and is thus outside of Applicants' recited range for the high molecular weight component with the substantially uniform comonomer distribution. Therefore, for at least these reasons, de Lange does not teach or suggest pending Claims 55-57, 59-64, 66, 69, 72-74 and 77-80.

In addition, de Lange does not teach or suggest the polyethylene composition as recited in new Claim 83. This reference teaches away from the use of the same catalyst system for the preparation of both the high-molecular-weight component and the low-molecular-weight component, by teaching that the preferred catalyst systems are a Ziegler catalyst for the high-molecular-weight component, and a chromocene catalyst on an oxidic support for the low-molecular-weight component (see above discussion). Moreover, de Lange teaches that the preparation of the chromocene-catalyzed low molecular weight component is advantageous over a preparation of a Ziegler-catalyzed low molecular weight component, because there is no need for low molecular weight organoaluminum compounds, as cocatalysts, in the former preparation (see column 3, lines 43-48). Such cocatalysts or their decomposition products could adversely affect the odor of the resultant polyethylene and blend (see column 3, lines 49-52). Thus, de Lange teaches away from catalyst systems that deviate from the preferred catalyst systems. Therefore, for at least these reasons, de Lange does not teach or suggest new Claim 83.

Finally, de Lange does not teach or suggest a polyethylene composition containing a low-molecular-weight (LMW) ethylene homopolymer that is prepared from a constrained geometry catalyst, and does not teach or suggest this feature in combination with the other features recited in new Claim 84. As discussed above, Applicants have shown improved properties in compositions that contain such a low molecular weight component, and these improved properties are indicative of the novelty of the composition, as claimed in Claim 84.

Therefore, for at least the above reasons, de Lange does not teach or suggest the invention as now claimed, and the rejection should be withdrawn.

Claim Rejection under 35 U.S.C. § 103(a)

The Examiner rejected Claims 55-75 and 78-80 under 35 U.S.C. § 103(a), as unpatentable over Bailey. Applicants respectfully traverse for the following reasons.

As discussed above Bailey does not teach or suggest pending Claims 55-75 and 78-80. Also, as discussed above, Bailey does not teach or suggest the polyethylene compositions, as recited in new Claims 83 and 84.

Therefore, for at least the above reasons, Bailey does not teach or suggest the invention as now claimed, and the rejection should be withdrawn.

Applicants respectfully submit that the present amendment is now in condition for allowance, and request early notice of such action.

If the Examiner has further questions, or believes further issues remain, the Examiner is invited to contact Applicants' undersigned representative.

Respectfully submitted,

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